§ 86.1867–12 CO₂ credits for reducing leakage of air conditioning refrigerant.

Manufacturers may generate credits applicable to the CO_2 fleet average program described in § 86.1865–12 by implementing specific air conditioning system technologies designed to reduce air conditioning refrigerant leakage over the useful life of their passenger automobiles and/or light trucks. Credits shall be calculated according to this section for each air conditioning system that the manufacturer is using to generate CO_2 credits. Manufacturers may also generate early air conditioning refrigerant leakage credits under this section for the 2009 through 2011 model years according to the provisions of § 86.1871–12(b).

(a) The manufacturer shall calculate an annual rate of refrigerant leakage from an air conditioning system in grams per year according to the procedures specified in SAE J2727 (incorporated by reference in § 86.1). In doing so, the refrigerant permeation rates for hoses shall be determined using the procedures specified in SAE J2064 (incorporated by reference in § 86.1) The annual rate of refrigerant leakage from an air conditioning system shall be rounded to the nearest tenth of a gram per year. The procedures of SAE J2727 may be used to determine leakage rates for HFC–134a and HFO–1234yf; manufacturers should contact EPA regarding procedures for other refrigerants. The annual rate of refrigerant leakage from an air conditioning system shall be rounded to the nearest tenth of a gram per year.

(b) The CO_2-equivalent gram per mile leakage reduction used to calculate the total leakage credits generated by an air conditioning system shall be determined according to this paragraph (b), separately for passenger automobiles and light trucks, and rounded to the nearest tenth of a gram per mile:

(1) Passenger automobile leakage credit for an air conditioning system:

$$Leakage\ Credit = MaxCredit \times \left[1 - \left(\frac{LeakScore}{16.6}\right) \times \left(\frac{GWP_{REF}}{1430}\right)\right] - HiLeakDis$$

Where:

MaxCredit is 12.6 (grams CO_2-equivalent/mile) for air conditioning systems using HFC–134a, and 13.8 (grams CO_2-equivalent/mile) for air conditioning systems using a refrigerant with a lower global warming potential.

LeakScore means the annual refrigerant leakage rate determined according to the procedures in SAE J2727 (incorporated by reference in § 86.1), where the refrigerant permeation rates for hoses shall be determined using the procedures specified in SAE J2064 (incorporated by reference in § 86.1). If the calculated rate is less than 8.3 grams/year (or 4.1 grams/year for systems using only electric compressors), the rate for the purpose of this formula shall be 8.3 grams/year (or 4.1 grams/year for systems using only electric compressors).

GWP$_{REF}$ means the global warming potential of the refrigerant as indicated in paragraph (e) of this section or as otherwise determined by the Administrator;

HiLeakDis means the high leak disincentive, which is zero for model years 2012 through 2016, and for 2017 and later model years is determined using the following equation, except that if GWP$_{REF}$ is greater than 150 or if the calculated result of the equation is less than zero, HiLeakDis shall be set equal to zero, or if the calculated result of the equation is greater than 1.8 g/mi, HiLeakDis shall be set to 1.8 g/mi:

$$HiLeakDis = 1.8 \times \left(\frac{(LeakScore - LeakThreshold)}{3.3}\right)$$

Where,

LeakThreshold = 11.0 for air conditioning systems with a refrigerant capacity less than or equal to 733 grams; or

LeakThreshold = [Refrigerant Capacity × 0.015] for air conditioning systems with a refrigerant capacity greater than 733 grams, where RefrigerantCapacity is the maximum refrigerant capacity specified

for the air conditioning system, in grams.

(2) Light truck leakage credit for an air conditioning system:

$$\text{Leakage Credit} = \text{MaxCredit} \times \left[1 - \left(\frac{\text{LeakScore}}{20.7}\right) \times \left(\frac{\text{GWP}_{REF}}{1430}\right)\right] - \text{HiLeakDis}$$

Where:

MaxCredit is 15.6 (grams CO_2-equivalent/mile) for air conditioning systems using HFC–134a, and 17.2 (grams CO_2-equivalent/mile) for air conditioning systems using a refrigerant with a lower global warming potential.

LeakScore means the annual refrigerant leakage rate determined according to the provisions of SAE J2727 (incorporated by reference in § 86.1),, where the refrigerant permeation rates for hoses shall be determined using the procedures specified in SAE J2064 (incorporated by reference in § 86.1). If the calculated rate is less than 10.4 grams/year (or 5.2 grams/year for systems using only electric compressors), the rate for the purpose of this formula shall be 10.4 grams/year (or 5.2 grams/year for systems using only electric compressors).

GWP$_{REF}$ means the global warming potential of the refrigerant as indicated in paragraph (e) of this section or as otherwise determined by the Administrator;

HiLeakDis means the high leak disincentive, which is zero for model years 2012 through 2016, and for 2017 and later model years is determined using the following equation, except that if GWP$_{REF}$ is greater than 150 or if the calculated result of the equation is less than zero, HiLeakDis shall be set equal to zero, or if the calculated result of the equation is greater than 2.1 g/mi, HiLeakDis shall be set to 2.1 g/mi:

$$\text{HiLeakDis} = 2.1 \times \left(\frac{(\text{LeakScore} - \text{LeakThreshold})}{3.3}\right)$$

Where:

LeakThreshold = 11.0 for air conditioning systems with a refrigerant capacity less than or equal to 733 grams; or

LeakThreshold = [Refrigerant Capacity × 0.015] for air conditioning systems with a refrigerant capacity greater than 733 grams, where RefrigerantCapacity is the maximum refrigerant capacity specified for the air conditioning system, in grams.

(c) The total leakage reduction credits generated by the air conditioning system shall be calculated separately for passenger automobiles and light trucks according to the following formula:

Total Credits (Megagrams) = (Leakage × Production × VLM) ÷ 1,000,000

Where:

Leakage = the CO_2-equivalent leakage credit value in grams per mile determined in paragraph (b)(1) or (b)(2) of this section, whichever is applicable.

Production = The total number of passenger automobiles or light trucks, whichever is applicable, produced with the air conditioning system to which to the leakage credit value from paragraph (b)(1) or (b)(2) of this section applies.

VLM = vehicle lifetime miles, which for passenger automobiles shall be 195,264 and for light trucks shall be 225,865.

(d) The results of paragraph (c) of this section, rounded to the nearest whole number, shall be included in the manufacturer's credit/debit totals calculated in § 86.1865–12(k)(5).

(e) The following values for refrigerant global warming potential (GWP$_{REF}$), or alternative values as determined by the Administrator, shall be used in the calculations of this section. The Administrator will determine values for refrigerants not included in this paragraph (e) upon request by a manufacturer.

(1) For HFC–134a, GWP$_{REF}$ = 1430;

(2) For HFC–152a, GWP$_{REF}$ = 124;

(3) For HFO–1234yf, GWP$_{REF}$ = 4;

(4) For CO_2, GWP$_{REF}$ = 1.

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